

## PATENT ABSTRACTS OF JAPAN

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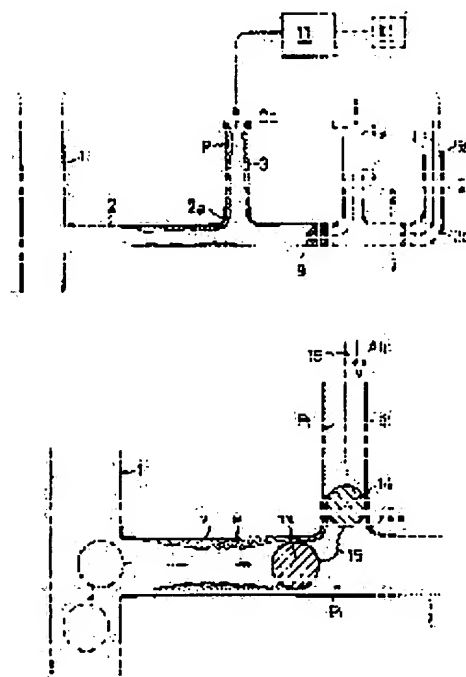
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## (54) METHOD FOR REGENERATING INSIDE SURFACE OF PIPELINE OF HORIZONTAL BRANCH

(57)Abstract:

PURPOSE: To clean the routes of the horizontal branches including the existing differential diameter pipes and differential diameter bends and joints, etc., of a structure, such as building, as they are, and to form smooth and fresh coating films having a uniform thickness over the entire inside wall surface thereof.

CONSTITUTION: The route of the horizontal branch 2 communicating with a waste stack 1 is cleaned and dried. A prescribed amt. of an epoxy resin coating material P is injected and distributed by applying the swirling motion in a flow direction thereto from the opening end 3a of an arbitrary drain pipe 3. Arbitrary numbers of expansion and contraction balls 13, 14 of the diameter slightly smaller than the largest diameter of the pipe to be applied prior to curing of the resin are connected and a rope 16 is connected to the extreme tail ball. These balls are inserted into the pipe from the opening end and are moved by air. After the balls are discharged from the terminal of the horizontal branch, the balls are reset and moved by the rope while the air is kept fed without interruption. The balls are taken out of the opening end and the smooth coating film having the uniform thickness is formed on the inside surface of the pipe by the jet flow of the air ejected from the spacings between the balls and the inside wall of the pipe. The coating films are successively and similarly formed in the routes of the other horizontal branches as well.



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CLAIMS

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## [Claim(s)]

Clean the duct of the wastewater quill which stands in a row in a waste stack, dry, give the circular movement to the flow direction from the opening edge of arbitrary drain pipes, and impregnation distribution of the epoxy resin coating of the specified quantity is carried out. Before the hardening, number[ of arbitration ]-connect the flexible ball of a diameter a little smaller than the maximum aperture of constructed tubing, and a rope is connected with the ball at the tail end. After inserting this ball into tubing from said opening edge, making it move by air and discharging said ball from the terminal of a wastewater quill, Carrying out continuation feeding of the air, carry out return migration with said rope, and it takes out from said opening edge. The regeneration approach of the duct inside of the wastewater quill characterized by forming a paint film with uniformly smooth thickness in a tubing inside by the jet style of the air spouted from the clearance between said balls and tube wall insides, and forming a paint film in other ducts similarly one by one hereafter.

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[Translation done.]

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the regeneration approach of the duct inside of the wastewater quill which discharges established \*\*\*\* to a building, a set high-rise apartment building, etc., and is used for the regeneration construction.

[0002]

[Description of the Prior Art] the drain pipe by which the duct of an established wastewater quill was connected to the structures, such as a building, for the exhaust port of instruments, such as a sink and a washstand, in each story -- splices, such as a cheese head, -- a single step -- it connects with the wastewater quill of large aperture -- having -- a stream predetermined in this wastewater quill -- inclination is maintained and it connects with the waste stack of the diameter of macrostomia which it arranged lengthwise in the structure. There was the following technical difficulty in regeneration of the inside of the duct of this wastewater quill, and formation of an especially new paint film conventionally. Namely, since a coating does not carry out a \*\*\*\*\* flow immediately from this opening edge even if it pours in a coating from the opening edge of the drain pipe connected to said instrument, and it gives a revolution flow to a coating by air and being lined A paint film is not formed in all the insides, and the part which separated a few from the opening edge in the internal surface of deflection splices, such as an elbow Since the bore became large rapidly rather than the aperture of tubing, a revolution flow of a coating collapsed, a uniform paint film could not be formed, but the problem had arisen in the holiday in the joint part especially. Furthermore, in the internal surface of the wastewater quill near the connection with a waste stack, since the air to which a coating is moved was spread in a waste stack with large aperture and a wind pressure fell, a paint film was not formed certainly.

[0003] As what solves this point, these people offer the approach of Japanese Patent Application No. No. 74177 [ three to ]. This cuts a wastewater quill near the connection of a waste stack, and forms the paint film by cleaning, desiccation, and EPOSHIKI plastic paint about the drain pipe between the opening edges linked to the opening edge obtained by cutting, and each aforementioned instrument.

[0004]

[Problem(s) to be Solved by the Invention] However, since each wastewater quill is piped inside the floor structure of each story, it needs to have to remove the floor plate or crown plate of this part in each story to cut a wastewater quill, and to restore this floor plate etc. after termination of regeneration construction, and usually has the difficulty which needs time amount, a staff and equipments, and materials for these extra works. Furthermore, although the cutting part of a wastewater quill was re-connected after that regeneration construction, even if it prevented leakage of water completely, there was a possibility that water might leak from this part by progress of the moon for years.

[0005] This invention enables it to form a smooth paint film in all the internal surfaces of the duct of the wastewater quill which is developed as a result of studying many things further based on the above-mentioned patent application, in order to solve the trouble, cleans the duct of an established wastewater quill in the condition as it is to the structures, such as a building, and contains different diameter tubing, the deflection splice part of a different diameter, etc. by uniform thickness. In addition, in this invention, the duct of a wastewater quill contains the quill part laid under the underground of the drain pipe of a standup connected to the exhaust port of each instrument, and a waste stack.

[0006]

[Means for Solving the Problem] Since the above-mentioned purpose is attained, the approach of this invention cleans the duct of the wastewater quill which stands in a row in a waste stack. Dry, give the circular movement to the flow direction from the opening edge of arbitrary drain pipes, and impregnation distribution of the epoxy resin coating of the specified quantity is carried out. Before the hardening, number[ of arbitration ]-connect the flexible ball of a diameter a little smaller than the maximum aperture of constructed tubing, and a rope is connected with the ball at the tail end. After inserting this ball into tubing from said opening edge, making it move by air and discharging said ball from the terminal of a wastewater quill, Carrying out continuation feeding of the air, carry out return migration with said rope, and it takes out from said opening edge. It is characterized by for thickness forming a uniform and smooth paint film in a tubing inside by the jet style of the air spouted from the clearance between said balls and tube wall insides, and forming a paint film in other ducts similarly one by one hereafter.

[0007]

[Function] After cleaning of the duct of a wastewater quill, and desiccation, since the circular movement to the flow direction is given from the opening edge of a drain pipe and the epoxy resin coating of the specified quantity is poured in, a coating is carried out with \*\* into tubing from all the internal surfaces of this opening edge. When connect the flexible ball of a diameter somewhat smaller than the greatest aperture of constructed tubing with the number string of arbitration, a rope is connected with the ball at the tail end, and it inserts into tubing and is made to move by air, subsequently, since the clearance between a ball and a tube wall inside is narrow the air passing through this clearance accelerates -- having -- a jet style -- becoming -- a travelling direction -- receiving -- the shape of a ring -- blowing off -- some of balls -- a front coating can wind up to a tube wall inside, and is extended, it flows in the shape of a cross-section ring, and a paint film is formed continuously. Since it occurs by the jet style of air as long as the annular style of this coating has said clearance, in the internal surface of deflection splices, such as an elbow with large wastewater quill with aperture larger one step than drain pipe and bore, a paint film is formed similarly. Moreover, a paint film is certainly formed also in the internal surface of the trailer of the wastewater quill linked to the waste stack of the diameter of macrostomia.

[0008] At the time of return migration of both balls, said jet style also becomes stronger and both balls form further into the continuation film the coating film once paint-film-ized by the annular style at the time of \*\*\*\* in order to move against the air sent in. Moreover, since both balls maintain predetermined spacing connected with a string and move In the back of the ball which serves as anteposition at the time of return migration the 1st continuation film-ization A line crack, Behind the ball which serves as the last at the time of a return, since the continuation film is finally formed, restoration shaping is carried out completely, the scratch marks of the rope produced in the paint film etc. are finished flat and smooth, and a paint film with uniformly smooth thickness is formed in a tube wall inside. Furthermore, since continuation film-ization of a coating is performed by both-way migration of both balls from a 2-way, a paint film is completely formed also in a joint part with deflection splices, such as an elbow, and a holiday is not produced.

[0009]

[Example] Drawing\_1 shows an example of the duct of the wastewater quill of the arbitration story in an upper-layers apartment, 1 is a waste stack, 2 is a

wastewater quill, a kitchen, a washstand, and each standup drain pipes 4, 5, and 6 connected to the exhaust port of each instrument of a bathroom are connected to this wastewater quill 2 by 2a, such as a cheese head, and the duct of the wastewater quill in this invention contains these drain pipes.

[0010] By this approach, the inside of the duct of a wastewater quill is cleaned as pretreatment. Although this cleaning can choose and use the conventional means, by this approach, it inserts the tube 8 which has an injection nozzle 7 at a tip one by one from the opening edges 3a, 4a, and 5a of each drain pipes 3, 4, and 5, inserts it even in a waste stack 1 through the wastewater quill 2, makes a jet stream inject from said nozzle 7, and removes the remnants object in tubing, slag, etc. Drawing 1 has shown this about the drain pipe 5.

[0011] Subsequently, as the drain pipe 4 of drawing 1 was shown, insert in each drain pipes 3, 4, and 5 the wire 10 which has Sucre Bar 9 at a tip one by one, and it is made to insert in to a waste stack 1 like the above, and with this wire 10, Sucre Bar's 9 tip is contacted to a tube wall inside, and carries out both-way migration. Thereby, a half-solid, rust, etc. adhering to a tube wall inside are scratched. Under the present circumstances, if the number of sheets of Sucre Bar's 9 wing is used making it increase from 15 sheets gradually like 30 sheets, the affix in tubing will be serially scratched completely from \*\*\*\* to a fine affix. If this scraping is completed, it will let water flow in tubing and an affix will be flushed.

[0012] Moreover, without carrying out \*\*\*\* by the high-pressure jet stream mentioned above, when aging of a tube wall inside is comparatively slight, said Sucre Bar 9 may be made to reciprocate within tubing immediately, and the affix of a tube wall inside may be \*\*\*\*(ed) scraping and after that.

[0013] Send hot blast to sequential or coincidence from the opening edge of each drain pipes 3, 4, and 5, it is made to keep blowing on a waste stack 1 after termination of the above-mentioned cleaning process, and the inside of tubing is often dried.

[0014] Then, as the drain pipe 3 of drawing 1 was shown, the epoxy resin coating of the specified quantity is poured in from the opening edge 3a. The trap tubing injector 11 which these people developed is used for this impregnation, and it is filled up with the coating in trap tubing, and if the air of a predetermined pressure is given and sent out from an air compressor 12, since it will flow the coating in trap tubing circling in the direction of a right angle to the flow direction and will advance into a drain pipe 3, a coating is immediately made a drain pipe 3 with \*\* from the internal surface of opening edge 3a of that leader.

[0015] After distribution of the above-mentioned coating and before that hardening, as shown in drawing 2, the flexible balls 13 and 14 of the number of arbitration (this example two pieces) are connected with the proper connection string 15, and a rope 16 is connected with the rear face of the ball 14 at the tail end, it inserts into tubing from opening edge 3a, air is sent, and both this ball is moved. This flexible ball is formed by the synthetic-resin material which has elasticity, such as urethane foam, and that diameter is made somewhat smaller than the greatest aperture of constructed tubing. Concretely, in this example, the aperture of the wastewater quill 2 used the ball with a diameter of 36-38mm, when the aperture of 50mm and a drain pipe 3 was 40mm. As air pressure force to which both this ball is moved, it is enough in the about two 0.3 - 1.0 kg/cm range, and when sending air to a drain pipe 3, the opening edge of other drain pipes 4 and 5 is blocked by the proper member.

[0016] The air which drawing 4 shows the operation in tubing of said both balls, and is sent in tubing First, since it blows ahead from the clearance (m) between this ball and a tube wall inside, flowing ahead from the clearance (m) between tube wall insides, and pressing the ball 13 of the anteposition, while pressing the ball 14 of end position, both balls move in the condition of having floated in the inside of tubing, without contacting a surrounding tube wall.

[0017] Since this clearance of the air passing through the aforementioned clearance (m) is narrow, it is accelerated, it becomes a jet style, and it blows off in the shape of a ring to a travelling direction, and about 2-3kg /of air pressure force in the front of a ball is set to 2 cm. For this reason, the coating (P) of a ball distributed ahead for a while is wound up and extended by the tube wall inside by this jet style, it flows in the shape of a cross-section ring, and the continuation film is formed and the paint film (p 1) of the thickness equivalent to said clearance (m) is formed in the tube wall inside which both balls passed. Since it occurs by the jet style of air as long as the annular style of this coating has said clearance (m), a paint film is formed also like the internal surface of deflection splice 2a, such as the wastewater quill 2 with aperture larger one step than a drain pipe 3, an elbow with a large bore, and a cheese head, and the joint part of a splice and tubing. Moreover, a paint film is certainly formed to the internal surface of the trailer of the wastewater quill 2 linked to the waste stack 1 of the diameter of macrostomia.

[0018] In addition, at the time of \*\*\*\* of both the balls 13 and 14, the air pressure force in the space between both balls fluctuates minutely, and in order that both balls may move in the inside of tubing, carrying out approach alienation gradually, the operation mentioned above is mainly performed by the ball 13 of the anteposition.

[0019] In this way, if both balls fall out and come out in a waste stack 1 (dashed line of drawing 2), a rope 16 will be lengthened, said both balls will be pulled back, continuing sending of air, as shown in drawing 3, and it will remove from opening edge 3a. Also in this return migration, although the jet style of the air mentioned above occurs behind both balls, in order that both balls may move against the air sent in, said jet style becomes stronger and forms further into the continuation film the coating film once paint-film-ized by the annular style at the time of \*\*\*\*. Moreover, since both balls maintain predetermined spacing connected with the string 15 and move in the back of the ball 14 which serves as anteposition at the time of return migration the 1st continuation film-ization A line crack, Behind the ball 13 which serves as the last at the time of a return, since the continuation film is finally formed, restoration shaping is carried out completely, the scratch marks of the rope 16 produced in the paint film etc. are finished flat and smooth, and a paint film with uniformly smooth thickness is formed in a tube wall inside. Furthermore, a paint film is fully formed also in the joint part of deflection splice 2a and tubing which had become the usual route side at the time of \*\*\*\* of a ball of this return migration.

[0020] Formation of the above-mentioned paint film carries out similarly one by one about the duct to [ after following the duct of the 1st drain pipe 3 ] a waste stack 1 from the 2nd drain pipe 4, and the duct to a waste stack 1 from the 3rd drain pipe 5, and, thereby, a paint film with uniform smooth thickness is formed also in the internal surface for a tee of the duct by deflection splice 2a, such as an elbow and a cheese head.

[0021] Drawing 5 is the example which applied this approach to quill partial 1a laid under the underground of a waste stack 1. In this case, a waste stack 1 is cut in a terrestrial proper location, the above-mentioned approach is performed from this opening edge 1b, and that operation is completely the same. In addition, 17 in drawing shows a catch basin.

[0022]

[Effect of the Invention] According to this invention, the following effectiveness is attained as explained in full detail above.

(\*\*) Since the circular movement to the flow direction is given from the opening edge of a wastewater quill and the epoxy resin coating of the specified quantity is poured in, a coating is certainly applied to all the internal surfaces of the opening edge of each wastewater quill, therefore a paint film can be immediately formed from this opening edge, and don't produce a non-painted part.

(\*\*) By carrying out return migration with a rope, connecting the flexible ball of the number of arbitration which has a clearance between tube wall insides with a string, connecting a rope with the ball at the tail end, inserting into tubing from said opening edge, and making it \*\*\*\* by air, and sending air It is what can perform paint film-ization which an annular flow was made to occur in coatings by the jet style of the air produced from this clearance, and continued. Especially at the time of double \*\*\*\*\* Since paint film-ization of an a large number stage is performed according to the connected number of balls, the thickness of a paint film equalizes, and a paint film is finished flat and smooth with the ball like the last, and the fitness of the water flow after construction can be carried out.

(\*\*) The duct of the established wastewater quill which a clearance is maintained between the internal surface also with tubing with which one step of aperture differs, does not produce the part of a holiday in the duct of a wastewater quill since an annular flow occurs in coatings and continuation paint film-ization is performed by the jet style of air, and contains different diameter tubing and the deflection splice of a different diameter with a flexible ball can be certainly made over in the condition as it is.

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[Translation done.]

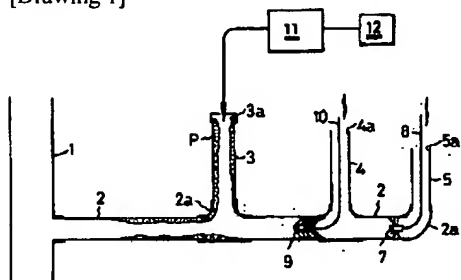
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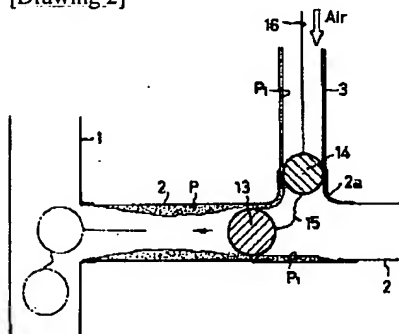
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## DRAWINGS

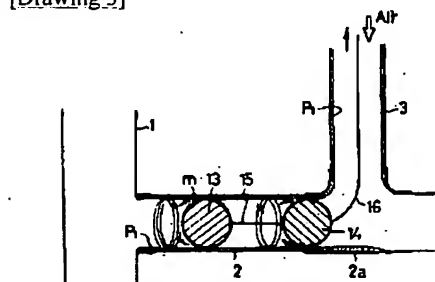
[Drawing 1]



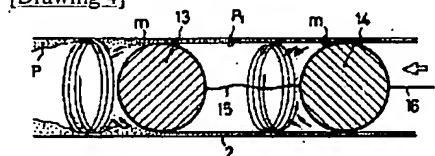
[Drawing 2]



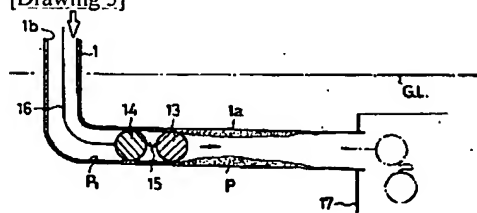
[Drawing 3]



[Drawing 4]



[Drawing 5]



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## CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law  
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[Procedure revision]  
 [Filing Date] June 3, Heisei 10  
 [Procedure amendment 1]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] The name of invention  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [Title of the Invention] The regeneration approach of the duct inside of a drain pipe  
 [Procedure amendment 2]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] Claim  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [Claim(s)]

[Claim 1] Clean the duct of the wastewater quill which stands in a row in a waste stack, and a drain pipe, and it dries. Give the circular movement to the flow direction from the opening edge of arbitrary drain pipes, and impregnation distribution of the epoxy resin coating of the specified quantity is carried out. Before the hardening, number[ of arbitration ]-connect the flexible ball of a diameter a little smaller than the maximum aperture of constructed tubing, and a rope is connected with the ball at the tail end. After inserting this ball into tubing from said opening edge, making it move by air and discharging said ball from the terminal of a drain pipe, Carrying out continuation feeding of the air, carry out return migration with said rope, and it takes out from said opening edge. The regeneration approach of the duct inside of the drain pipe characterized by forming a paint film with uniformly smooth thickness in a tubing inside by the jet style of the air spouted from the clearance between said balls and tube wall insides, and forming a paint film in other ducts similarly one by one hereafter.

[Procedure amendment 3]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] 0001  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [0001]

[Industrial Application] This invention relates to the regeneration approach of the duct inside of the drain pipe which discharges established \*\*\*\* to a building, a set high-rise apartment building, etc., and is used for the regeneration construction.

[Procedure amendment 4]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] 0002  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [0002]

[Description of the Prior Art] the drain pipe by which the duct of an established drain pipe was connected to the structures, such as a building, for the exhaust port of instruments, such as metaphor \*\*\*\*\* and a washstand, in each story -- splices, such as a cheese head, -- a single step -- it connects with the



wastewater quill of large aperture -- having -- a stream predetermined in this wastewater quill -- inclination is maintained and it connects with the waste stack of the diameter of macrostomia which it arranged lengthwise in the structure. There was the following technical difficulty in regeneration of the inside of the duct of this drain pipe, and formation of an especially new paint film conventionally. Namely, since a coating does not carry out a \*\*\*\*\* flow immediately from this opening edge even if it pours in a coating from the opening edge of the drain pipe connected to said instrument, and it gives a revolution flow to a coating by air and being lined A paint film is not formed in all the insides, and the part which separated a few from the opening edge in the internal surface of deflection splices, such as an elbow Since the bore became large rapidly rather than the aperture of tubing, a revolution flow of the department of \*\* collapsed, a uniform paint film could not be formed, but the problem had arisen in the holiday in the joint part especially. Furthermore, in the internal surface of the wastewater quill near the connection with a waste stack, since the air to which a coating is moved was spread in a waste stack with large aperture and a wind pressure fell, a paint film was not formed certainly.

[Procedure amendment 5]

[Document to be Amended] Specification

[Item(s) to be Amended] 0005

[Method of Amendment] Modification

[Proposed Amendment]

[0005] This invention enables it to form a smooth paint film in all the internal surfaces of the duct of the drain pipe which is developed as a result of studying many things further based on the above-mentioned patent application, in order to solve the trouble, cleans the duct of an established drain pipe in the condition as it is to the structures, such as a building, and contains different diameter tubing, the deflection splice part of a different diameter, etc. by uniform thickness. In addition, in this invention, the duct of a drain pipe contains the quill part laid under the underground of the drain pipe of the riser which stands connected to the exhaust port of each instrument, a wastewater quill, and a waste stack.

[Procedure amendment 6]

[Document to be Amended] Specification

[Item(s) to be Amended] 0007

[Method of Amendment] Modification

[Proposed Amendment]

[0007]

[Function] After cleaning of the duct of a drain pipe and a wastewater quill, and desiccation, since the revolution linkage to the flow direction is given from the opening edge of a drain pipe and the epoxy resin coating of the specified quantity is poured in, a coating is carried out with \*\* into tubing from all the internal surfaces of this opening edge. Subsequently, if connect the flexible ball of a diameter somewhat smaller than the greatest aperture of constructed tubing with the number string of arbitration, a rope is connected with the ball at the tail end, and it inserts into tubing and is made to move by air, it is because of the clearance between a ball and a tube wall inside being narrow, the air passing through this clearance accelerates -- having -- a jet style -- becoming -- a travelling direction -- receiving -- the shape of a ring -- blowing off -- some of balls -- a front coating can wind up to a tube wall inside, and is extended, it flows in the shape of a cross-section ring, and a paint film is formed continuously. Since it occurs by the jet style of air as long as the annular style of this coating has said clearance, in the internal surface of deflection splices, such as an elbow with large wastewater quill with aperture larger one step, of course than this drain pipe and bore, as for the internal surface of a drain pipe, a paint film is formed similarly. Moreover, a paint film is certainly formed also in the internal surface of the trailer of the wastewater quill linked to the waste stack of the diameter of macrostomia, and a drain pipe.

[Procedure amendment 7]

[Document to be Amended] Specification

[Item(s) to be Amended] 0009

[Method of Amendment] Modification

[Proposed Amendment]

[0009]

[Example] Drawing 1 shows an example of the duct of the drain pipe of the arbitration story in an upper-layers apartment, 1 is a waste stack, 2 is a wastewater quill, a kitchen, a washstand, and each standup drain pipes 3, 4, and 5 connected to the exhaust port of each instrument of a bathroom are connected to this wastewater quill 2 by 2a, such as a cheese head, and the duct of the drain pipe in this invention contains these wastewater quills and a drain pipe.

[Procedure amendment 8]

[Document to be Amended] Specification

[Item(s) to be Amended] 0010

[Method of Amendment] Modification

[Proposed Amendment]

[0010] By this approach, the inside of the duct of a drain pipe is cleaned as pretreatment. Although this cleaning can choose and use the conventional means, by this approach, insert it at a tip one by one from the opening edges 3a, 4a, and 5a of tube 8 each drain pipes 3, 4, and 5 which have an injection nozzle 7, insert it even in a waste stack 1 through the wastewater quill 2, it makes a jet stream inject from said nozzle 7, and removes the remnants object in tubing, slag, etc.

Drawing 1 has shown this about the drain pipe 5.

[Procedure amendment 9]

[Document to be Amended] Specification

[Item(s) to be Amended] 0022

[Method of Amendment] Modification

[Proposed Amendment]

[0022]

[Effect of the Invention] According to this invention, the following effectiveness is attained as explained in full detail above.

(\*\*) Since the circular movement to the flow direction is given from the opening edge of a drain pipe and the epoxy resin coating of the specified quantity is poured in, a coating is certainly applied to all the internal surfaces of the opening edge of each drain pipe, therefore a paint film can be immediately formed from this opening edge, and don't produce a non-painted part on the whole surface of a drain pipe and a wastewater quill.

(\*\*) The flexible ball of the number of arbitration which has a clearance is connected between tube wall insides with a string, connect a rope with the ball at the tail end, insert into tubing from said opening edge, and it is air. Paint film-ization which an annular flow was made to occur in coatings by the jet style of the air produced from this clearance by carrying out return migration with a rope, and continued can be performed making it \*\*\*\* and sending air, especially, since paint film-ization of an a large number stage is performed according to the connected number of balls at the time of return migration, the thickness of a paint film equalizes, and a paint film is finished flat and smooth with the ball like the last, and fitness can carry out in the water flow after construction.

(\*\*) The established drain pipe way which a clearance is maintained between the internal surface also with tubing with which one step of aperture differs, does not produce the part of a holiday in the duct of a drain pipe since an annular flow occurs in coatings and continuation paint film-ization is performed by the jet style of air, and contains different diameter tubing and the deflection splice of a different diameter with a flexible ball can be certainly made over in the condition as it is.

[Translation done.]

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(43)公開日 平成6年(1994)5月10日

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	3/12	Z	8720-4D	
	7/24	3 0 2 U	8720-4D	

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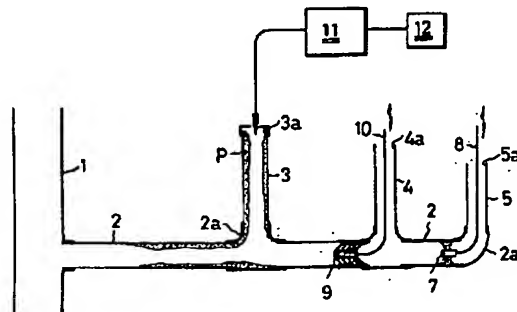
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(32)優先日	平 3 (1991) 3 月15日		
(33)優先権主張国	日本 (J P)		

(54)【発明の名称】 排水横管の管路内面の更生方法

(57)【要約】

【目的】 ビル等の構造物に既設の異径管及び異径の曲がり継ぎ手部分等を含む排水横管の経路をそのままの状態でクリーニングし、且つその全内壁面に均一な厚みの平滑な新らしい塗膜を形成する。

【構成】 排水縦管 1 に連なる排水横管 2 の経路をクリーニング、乾燥し、任意の排水管 3 の開口端 3 a から流動方向に対する旋回運動を与えて所定量のエポキシ樹脂塗料 P を注入配布し、その硬化前に、被施工管の最大口径よりやや小さい直径の伸縮ボール 1 3, 1 4 を任意数連結して最後尾のボールにロープ 1 6 を連結し、このボールを前記開口端から管内に挿入してエアにより移動させ、前記ボールが排水横管の端末から排出された後、エアを継続送入しつつ前記ロープにより復帰移動させて開口端から取り出し、前記ボールと管壁内面の隙間から噴出するエアのジェット流により管内面に厚みが均一で且つ平滑な塗膜を形成し、他の排水横管経路も順次同様にして塗膜を形成する。



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## 【特許請求の範囲】

排水縦管に連なる排水横管の管路をクリーニング、乾燥し、任意な排水管の開口端から流動方向に対する旋回運動を与えて所定量のエポキシ樹脂塗料を注入配布し、その硬化前に、被施工管の最大口径よりやや小さい直径の伸縮ボールを任意数連結して最後尾のボールにロープを連結し、このボールを前記開口端から管内に挿入してエアにより移動させ、前記ボールが排水横管の端末から排出された後、エアを継続送入しつつ前記ロープにより復帰移動させて前記開口端から取り出し、前記ボールと管壁内面の隙間から噴出するエアのジェット流により管内面に厚みが均一で且つ平滑な塗膜を形成し、以下、順次同様にして他の管路に塗膜を形成することを特徴とする排水横管の管路内面の更生方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、ビル、集合高層住宅などに既設の雑水を排出する排水横管の管路内面の更生方法に係るもので、その更生工事に用いられる。

## 【0002】

【従来の技術】ビル等の構造物に既設の排水横管の管路は、各階において、例えば流し台、洗面台などの器具の排水口に接続された排水管がチーズ等の継ぎ手によって一段階大きい口径の排水横管に接続され、この排水横管は所定の流水勾配を保ち、構造物内に縦設された大口径の排水縦管に接続されている。この排水横管の管路の内面の更生、とくに新しい塗膜の形成には、従来、次のような技術的困難性があった。すなわち、前記器具に接続された排水管の開口端から塗料を注入し、エアにより塗料に旋回流動を与えてライニングしても、塗料はこの開口端から直ちには旋回流動しないので、開口端から少し離れた部分まではその全内面に塗膜が形成されないし、また、エルボ等の曲がり継ぎ手の内壁面では、管の口径よりもその内径が急激に大きくなるから塗料の旋回流動が崩れて均一な塗膜を形成できず、とくにその継ぎ手部分での塗り残しに問題が生じていた。さらに、排水縦管との接続部近くの排水横管の内壁面では、塗料を移動させるエアが口径の大きい排水縦管に拡散して風圧が低下するため、確実に塗膜が形成されなかった。

【0003】この点を解決するものとして、本出願人は、特願平3-74177号の方法を提供している。これは、排水横管を排水縦管の接続部近くで切断し、切断によって得られた開口端と前記の各器具に接続する開口端との間の排水管について、クリーニング、乾燥、エポキシ樹脂塗料による塗膜の形成を行うものである。

## 【0004】

【発明が解決しようとする課題】しかし、各排水横管は、通常、各階の床構造の内部に配管されているから、排水横管を切断するには各階において該部分の床板又は天井板を剥さなければならず、また、更生工事の終了後

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にこの床板等を復元することが必要であり、これらの余分な工事に時間、人員及び機材、資材を必要とする難点がある。さらに、排水横管の切断箇所はその更生工事後に再接続するのであるが、漏水を完全に防止しても、長年月の経過によりこの部分から漏水するおそれがあった。

【0005】本発明は上記の特許出願に基づき、その問題点を解決するためさらに種々研究した結果開発されたものであり、ビル等の構造物に既設の排水横管の管路をそのままの状態でのクリーニングし、且つ異径管及び異径の曲がり継ぎ手部分等を含む排水横管の管路の全内壁面に均一な厚みで平滑な塗膜を形成できるようにしたものである。なお、本発明において排水横管の管路とは、各器具の排水口に接続された立ち上がりの排水管、及び排水縦管の地中に埋設された横管部分を含むものである。

## 【0006】

【課題を解決するための手段】上記の目的を達するため、本発明の方法は、排水縦管に連なる排水横管の管路をクリーニング、乾燥し、任意な排水管の開口端から流動方向に対する旋回運動を与えて所定量のエポキシ樹脂塗料を注入配布し、その硬化前に、被施工管の最大口径よりやや小さい直径の伸縮ボールを任意数連結して最後尾のボールにロープを連結し、このボールを前記開口端から管内に挿入してエアにより移動させ、前記ボールが排水横管の端末から排出された後、エアを継続送入しつつ前記ロープにより復帰移動させて前記開口端から取り出し、前記ボールと管壁内面の隙間から噴出するエアのジェット流により管内面に厚みが均一で且つ平滑な塗膜を形成し、以下、順次同様にして他の管路に塗膜を形成することを特徴としている。

## 【0007】

【作用】排水横管の管路のクリーニング、乾燥後、排水管の開口端から流動方向に対する旋回運動を与えて所定量のエポキシ樹脂塗料を注入するので、塗料はこの開口端の全内壁面から管内に塗付される。次いで、被施工管の最大の口径より少し小さい直径の伸縮ボールを任意数紐で連結し、最後尾のボールにロープを連結して管内に挿入しエアにより移動させると、ボールと管壁内面との隙間が狭いために、この隙間を通るエアが加速されジェット流となって進行方向に対しリング状に噴出し、ボールの少し前方の塗料が管壁内面に巻き上げられて引き延ばされ、横断面リング状に流動して連続的に塗膜が形成される。この塗料の環状流は、前記隙間がある限りエアのジェット流によって生起するから、排水管よりも口径が一段大きい排水横管、及び内径が大きいエルボ等の曲がり継ぎ手の内壁面においても、同様に塗膜が形成される。また、大口径の排水縦管に接続した排水横管の終端部の内壁面にも、確実に塗膜が形成される。

【0008】両ボールの復帰移動時には、両ボールは送り込まれるエアに逆らって移動するため前記ジェット流

もより強くなり、往動時の環状流によって一旦塗膜化された塗料膜をさらに連続膜化する。また、両ボールは紐で連結された所定の間隔を保って移動するので、復帰移動時に前位となるボールの後方において第1の連続膜化が行われ、復帰時に最後位となるボールの後方では最終的に連続膜化されるから、塗膜に生じたロープの擦過痕等が完全に修復成形されて平滑に仕上げられ、管壁内面には厚みが均一で且つ平滑な塗膜が形成される。さらに、塗料の連続膜化は両ボールの往復移動によって2方向から行われるので、エルボ等の曲がり継ぎ手との継ぎ目部分にも完全に塗膜が形成され、塗り残しを生じない。

【0009】

【実施例】図1は、高層集合住宅における任意階の排水横管の管路の一例を示し、1は排水縦管、2は排水横管であり、この排水横管2には、例えば台所、洗面台、風呂場の各器具の排水口に接続された各立ち上がり排水管4、5、6がチーズ等2aで接続されており、本発明における排水横管の管路は、これらの排水管を含むものである。

【0010】本方法では、前処理として排水横管の管路内をクリーニングする。このクリーニングは従来の手段を選択して用いることができるが、本方法では、先端に噴射ノズル7を有するチューブ8を各排水管3、4、5の開口端3a、4a、5aから順次に挿入し、排水横管2を通して排水縦管1にまで挿通し、前記ノズル7からジェット水流を噴射させて管内の残滓物、ノロなどを除去する。図1では、排水管5についてこれを示してある。

【0011】次いで、図1の排水管4について示したように、先端にスクレバー9を有するワイヤー10を各排水管3、4、5に順次に挿入して前記と同様に排水縦管1まで挿通させ、このワイヤー10により、スクレバー9の先端を管壁内面に接触させて往復移動させる。これにより、管壁内面に付着した半固形物、錆などが掻き取られる。この際、スクレバー9の羽根の枚数を、例えば15枚から30枚などのように段階的に増加させて使用すると、管内の付着物は、荒錆から細かな付着物まで逐次完全に掻き取られる。この掻き取りが終了したら、管内に通水して付着物を洗い流す。

【0012】また、管壁内面の老化が比較的軽度な場合には、前述した高圧ジェット水流による洗管をすることなく、直ちに前記スクレバー9を管内で往復動させて管壁内面の付着物を掻き取り、その後、洗管してもよい。

【0013】上記のクリーニング工程の終了後、各排水管3、4、5の開口端から順次又は同時に熱風を送って排水縦管1に吹き抜けさせ、管内をよく乾燥させる。

【0014】その後、図1の排水管3について示したように、その開口端3aから所定量のエポキシ樹脂塗料を注入する。この注入には、本出願人の開発したトラップ

管注入装置11が用いられるもので、トラップ管内に塗料を充填しておき、エアコンプレッサ12から所定の圧力のエアを与えて送り出すと、トラップ管内の塗料が流動方向に対し直角方向に旋回しつつ流動して排水管3内に進入するから、排水管3には、その始端部の開口端3aの内壁面から直ちに塗料が塗付される。

【0015】上記の塗料の配布後、その硬化前に、図2に示すように、任意数（本実施例では2個）の伸縮ボール13、14を適宜な連結紐15で連結し、且つ最後尾のボール14の後面にロープ16を連結して開口端3aから管内に挿入し、エアを送ってこの両ボールを移動させる。この伸縮ボールは発泡ウレタン等の伸縮性を有する合成樹脂材で形成され、その直径は被施工管の最大の口径より少し小さくしてある。具体的に、本実施例では、排水横管2の口径が50mm、排水管3の口径が40mmの場合に、直径36～38mmのボールを使用した。この両ボールを移動させるエア圧力としては、0.3～1.0kg/cm<sup>2</sup>程度の範囲で充分であり、また、排水管3にエアを送るときは、他の排水管4、5の開口端は適宜な部材で閉塞しておく。

【0016】図4は、前記両ボールの管内における作用を示すもので、管内に送られるエアは、まず、後位のボール14を押圧するとともに管壁内面との隙間(m)から前方に流れ、前位のボール13を押圧しつつこのボールと管壁内面との隙間(m)から前方に吹き抜けるので、両ボールは周囲の管壁に接触することなく、浮揚された状態で管内を移動する。

【0017】前記の隙間(m)を通るエアは、この隙間が狭いために加速され、ジェット流となって進行方向に対しリング状に噴出し、ボールの前方におけるエア圧力はほぼ2～3kg/cm<sup>2</sup>となる。このため、ボールの少し前方に配布された塗料(P)は、このジェット流により、管壁内面に巻き上げられて引き延ばされ横断面リング状に流動して連続膜化されるのであり、両ボールの通過した管壁内面には、前記隙間(m)に相当する厚さの塗膜(p<sub>1</sub>)が形成される。この塗料の環状流は、前記隙間(m)がある限りエアのジェット流によって生起するから、排水管3よりも口径が一段大きい排水横管2、内径の大きいエルボ、チーズ等の曲がり継ぎ手2aの内壁面、及び継ぎ手と管との継ぎ目部分にも同様に塗膜が形成される。また、大口径の排水縦管1に接続した排水横管2の終端部の内壁面まで確実に塗膜が形成される。

【0018】なお、両ボール13、14の往動時には、両ボールの間の空間内のエア圧力が微細に増減し、両ボールは段階的に接近離間しながら管内を移動するため、前述した作用は主に前位のボール13によって行われる。

【0019】こうして両ボールが排水縦管1内に抜け出たら（図2の1点鎖線）、図3に示すように、エアの送

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り込みを継続しつつロープ16を引いて前記両ボールを引き戻し、開口端3aから取り外す。この復帰移動においても、両ボールの後方には前述したエアのジェット流が発生するが、両ボールは送り込まれるエアに逆らって移動するため前記ジェット流がより強くなり、往動時の環状流によって一旦塗膜化された塗料膜をさらに連続膜化する。また、両ボールは紐15で連結された所定の間隔を保って移動するので、復帰移動時に前位となるボール14の後方において第1の連続膜化が行われ、復帰時に最後位となるボール13の後方では最終的に連続膜化されるから、塗膜に生じたロープ16の擦過痕などが完全に修復成形されて平滑に仕上げられ、管壁内面には厚みが均一で且つ平滑な塗膜が形成される。さらに、この復帰移動により、ボールの往動時に順路側となっていた曲がり継ぎ手2aと管との継ぎ目部分にも、十分に塗膜が形成される。

【0020】上記の塗膜の形成は、第1の排水管3の管路について行ったのち、第2の排水管4から排水縦管1にいたる管路、第3の排水管5から排水縦管1にいたる管路について順次同様にして行うもので、これにより、エルボ、チーズ等の曲がり継ぎ手2aによる管路の分岐部分の内壁面にも、均一な厚みの平滑な塗膜が形成される。

【0021】図5は、排水縦管1の地中に埋設された横管部分1aに本方法を適用した実施例である。この場合には、排水縦管1を地上の適宜な位置で切断し、この開口端1bから上記の方法を行うもので、その作用は全く同様である。なお、図中17は排水柵を示す。

【0022】

【発明の効果】以上に詳説したように、本発明によれば次のような効果が達成される。

(イ) 排水横管の開口端から流動方向に対する巡回運動を与えて所定量のエポキシ樹脂塗料を注入するので、各排水横管の開口端の全内壁面には確実に塗料が塗布され、したがってこの開口端から直ちに塗膜を形成するこ

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とができ、未塗装の部分を生じない。

(ロ) 管壁内面との間に隙間を有する任意数の伸縮ボールを紐でつないで最後尾のボールにロープを連結し、前記開口端から管内に挿入してエアにより往動させ且つエアを送りつつロープで復帰移動させることにより、この隙間から生ずるエアのジェット流により塗料に環状流動を生起させて連続した塗膜化ができるもので、とくに復帰移動時には、連結したボール数に応じて多数段の塗膜化が行われるから塗膜の厚みが均一化し、且つ最後位のボールにより塗膜が平滑に仕上げられて工事後の通水を良好できる。

(ハ) 伸縮ボールにより、口径が一段階異なる管でもその内壁面との間に隙間が保たれ、エアのジェット流によって塗料に環状流動が生起し連続塗膜化が行われるから、排水横管の管路に塗に残しの部分を生ずることがなく、異径管及び異径の曲がり継ぎ手を含む既設の排水横管の管路をそのままの状態確実に更生できる。

【図面の簡単な説明】

【図1】本発明の更生方法の一実施例を示す概念図である。

【図2】ボールの往動時の作用説明図である。

【図3】ボールの復帰移動時の作用説明図である。

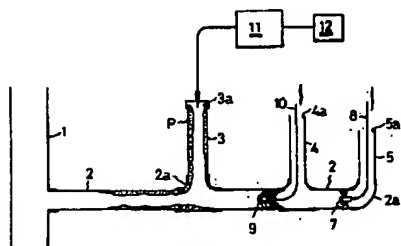
【図4】伸縮ボールのジェット流による連続膜化の作用説明図である。

【図5】排水縦管の地下横管部分に適用した実施例の概念図である。

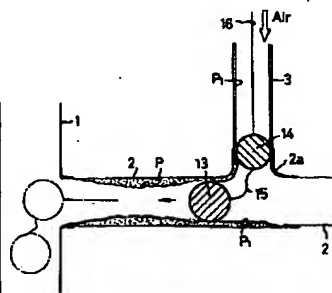
【符号の説明】

1…排水縦管	2…排水横管
3, 4, 5…排水管	3a, 4a, 5a…開口端
7…噴射ノズル	9…スクレパー
13, 14…伸縮ボール	16…ロープ
m…隙間	p…塗料
p1…塗膜	

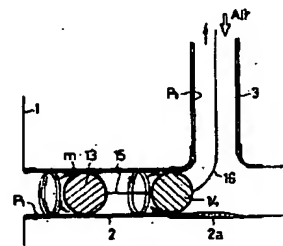
【図1】



【図2】



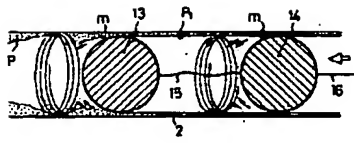
【図3】



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【図4】



【図5】

